

NEW DISTRIBUTION NOTES ON THE MOSSES OF
MASSACHUSETTS

JEANNE E. ANDERSON

The Nature Conservancy, New Hampshire Chapter,
2 ½ Beacon Street, Suite 6, Concord, NH 03301-4447

SARAH COOPER-ELLIS

Harvard Forest, P.O. Box 68,
Petersham, MA 01366-0068

BENITO C. TAN

Department of Botany, School of Biological Sciences,
National University of Singapore, Singapore 119260

ABSTRACT. Eighteen moss species new to Massachusetts and 194 additional county records are reported. The new state records are briefly discussed. All county records are listed in an appendix. The moss flora of Massachusetts now stands at 356 species and 16 varieties.

Key Words: mosses, Massachusetts, state records, county records

Our knowledge of the moss flora of Massachusetts is substantially described in three previous papers (Hilferty 1960; Judd 1980; Mishler and Miller 1983). In addition, Welch (1960), Ireland (1969), Shaw (1981), and Crum and Anderson (1981) provided reports for certain Massachusetts mosses. Welch (1960) detailed state and county locality data for five taxa of the genus *Fontinalis* Hedw., *F. antipyretica* var. *oregonensis* Ren. & Card., *F. flaccida* Ren. & Card., *F. hypnoides* var. *duriaei* (Schimp.) Husn., *F. novae-angliae* var. *cymbifolia* (Aust.) Welch in Grout, and *F. sullivantii* Lindb. Ireland (1969) reported the first record of *Plagiothecium laetum* Schimp. in B.S.G. for the state from Essex County. Shaw (1981) reported Massachusetts records for *Pohlia andalusica* (Hohn.) Broth. (Berkshire County) and *Pohlia drummondii* (C. Mull.) Andrews. Crum and Anderson (1981) added records for *Orthotrichum speciosum* var. *elegans* (Schwaegr. ex Hook. & Grev.) Warnst., *F. filiformis* Sull. & Lesq. in Aust., *Sphagnum pylaisii* Brid., and *S. trinitense* C. Mull. For the last three taxa, we are unaware of any published county lo-

cality. Finally, Sorrie and Dunwiddie (1996) recently reported new state and county records for Nantucket.

The additions to the Massachusetts moss flora reported here are generated from eleven private collections. The identifications of specimens reported as new county or state records have been confirmed by the third author and are deposited in the Farlow Herbarium (FH) in Cambridge, Massachusetts. The collectors of these specimens and their affiliated institutions or home towns at the time the collections were made include the following: Jeanne E. Anderson (JEA) and Peter W. Dunwiddie (PWD)—Massachusetts Audubon Society; Sarah Cooper-Ellis (SC-E)—Smith College and Harvard Forest; Carol Knapp (CK)—Chilmark, Massachusetts; Glenn Motzkin (GM) and Paul Wilson (PW)—Harvard Forest; Lois Quillinan (LQ)—Glenville, New York; Sally Shaw (SS)—The Nature Conservancy; Nancy Slack (NS)—Russell Sage College; Susan A. Williams (SAW)—Rowe, Massachusetts; and Benito C. Tan (BCT) and Raymond Abair (RA)—Farlow Herbarium, Harvard University.

The moss flora of Massachusetts now consists of 356 species and 16 varieties. Overall, the flora consists predominantly of temperate species, with limited representation of circumboreal and polar/alpine species. To date, only six species on the state checklist, *Dicranella heteromalla* (Hedw.) Schimp., *Dicranum scoparium* Hedw., *Hypnum imponens* Hedw., *Polytrichum commune* Hedw., *P. piliferum* Hedw., and *Sphagnum palustre* L., are reported for every county in the state. In contrast, 82 taxa are known through only one county record and nearly half the taxa (ca. 182) are known from four or fewer counties. Not included in our count are two species introduced through the transport of planting materials and garden practices. *Callicostella pallida* (Hornsch.) Aongstr. and *Vesicularia vesicularis* (Schwaegr.) Broth., both widespread tropical American moss species, have been recently discovered growing on the soil of potted plants within greenhouses in Concord, Massachusetts.

Our compiled distribution records for Massachusetts mosses indicate that the local moss flora has not been thoroughly studied. For example, some common New England mosses such as *Polytrichum pallidisetum* and *Atrichum altecristatum* are reported here as additions to the state flora. In contrast, the Massachusetts record of *Desmatodon plinthobius* is the first report of the species north of New Jersey, representing a significant northward expan-

sion of its range in eastern North America. One other species, *Pseudoleskeella tectorum* is also reported for the first time for New England. County level distribution in Massachusetts is best documented for Berkshire (231 taxa), Bristol (208), Essex (203), Middlesex (206), Norfolk (190), Worcester (185), Franklin (157), Suffolk (138), and Nantucket (83) Counties. The reported moss floras of Barnstable (52 taxa), Dukes (41), Hampden (89), Hampshire (106), and Plymouth (88) Counties are hardly complete. The authors are currently preparing a new state and county checklist that details these records.

A brief discussion of each of the eighteen state record species is presented below. New county records based on published information are listed as an appendix. Each species is cited with locality information and the initials of its collector(s) (see above). Nomenclature follows primarily that of Anderson, Crum, and Buck (1990). Exceptions include *Sphagnum* and *Leucodon andrewsianus* which use Anderson (1990) and Reese and Anderson (1997) respectively. Descriptions of worldwide species range and national distribution are taken from Crum and Anderson (1981) unless otherwise noted.

Atrichum altecristatum (Ren. & Card.) Smyth & Smyth (POLYTRICHACEAE)

Dukes County (Chilmark) CK

Essex County (Sagamore Hill Solar Observatory, Hamilton) BCT & RA

Franklin County (Rowe) SAW

Hampden County (Westover Air Force Base, Chicopee) BCT

Norfolk County (Blue Hills Reservation, MDC, Milton) BCT & RA

In North America, this species has a broad range from Saskatchewan, Nebraska, and Kansas eastward. Tan collected this species on two sites at Westover Air Force Base in Chicopee. One specimen was found in a mesic mixed-hardwood forest. The second was collected near Stoney Brook from the base of a tree along a path on disturbed ground near a deeply shaded red maple wetland. The Franklin County specimen was found growing with *Polytrichum piliferum* on exposed dirt and rock next to a brook.

Brachythecium turgidum (C. J. Hartm.) Kindb. (BRACHYTHECIACEAE)

Norfolk County (Hale Reservation, Trustees of Reservations, Westwood) BCT

Ireland (1982) described the habitat of this species as wet soil and rocks near streams, pools, or waterfalls, usually in calcareous habitats. Tan found this species in swampy sites on the Hale Reservation. This species is considered critically imperiled in New York State (Clemants and Ketchledge 1990). Although ranked as apparently secure throughout its global range, it is known from five or fewer sites in New York. The Massachusetts record appears among the most southern locations reported for this species in the eastern United States.

***Bryum dichotomum* Hedw. (BRYACEAE)**

Essex County (Sagamore Hill Solar Observatory, Hamilton) BCT & RA

A large population of this species with the typical pendulous, short cylindrical capsules was found along the margin of an abandoned road inside the restricted compound of Sagamore Hill Solar Observatory and Antennae Complex in the town of Hamilton. Individual plants also bore 1 or 2 large, greenish bulbils in their leaf axils. The Massachusetts specimen matches the illustration of this species in Smith and Whitehouse (1978) and Crum and Anderson (1981). A widespread species in disturbed sites across the northern hemisphere, the local population of *Bryum dichotomum*, better known in old publications as *B. bicolor*, was found growing intermixed with *Bryum argenteum* Hedw., *Barbula unguiculata* Hedw. and *Ceratodon purpureus* (Hedw.) Brid.

***Calliargon giganteum* (Schimp.) Kindb. (AMBLYSTEGIACEAE)**

Berkshire County (Mount Everett Wildlife Sanctuary, Massachusetts Audubon Society, Sheffield) JEA

Franklin County (Hawley Bog, Hawley) SC-E

Collected from a seasonal pond within a hardwood swamp in Berkshire County and from a red maple swamp at the south end of Hawley Bog in Franklin County. The latter site occurs within an area of wetland that contains some rare liverwort taxa, another state moss record, *Warnstorfia pseudostraminea*, and vascular plants characteristic of circumneutral conditions. Common and widespread at northern latitudes, this species extends as far south

as Pennsylvania and Michigan. It is also wide-ranging in Europe and across Asia.

Desmatodon plinthobius Sull. & Lesq. in Sull. (POTTIACEAE)
Middlesex County (Harvard University campus, Cambridge) BCT

This species was collected from a brick wall of a campus building near the Harvard University Herbaria. Elsewhere, this species grows on concrete or mortared walls, preferring calcareous substrates in the wild. It is most common in the southern states of eastern North America. Crum and Anderson (1981) reported the northern end of its range as New Jersey and Pennsylvania. Consequently, this collection represents the first reported extension of the range of this species into New England.

Ditrichum rhynchostegium Kindb. (DITRICHACEAE)

Essex County (Sagamore Hill Solar Observatory, Hamilton) BCT
& RA

This species was found at two sites at the observatory. Both are disturbed sites under shaded and semi-open tree and shrub communities in wet areas. Crum and Anderson (1981) reported this species as endemic to eastern North America with a range from Nova Scotia to Georgia and west to Ohio, Tennessee, and Arkansas.

Fissidens exilis Hedw., (FISSIDENTACEAE)

Essex County (Sagamore Hill Solar Observatory, Hamilton) BCT
& RA

A small, fruiting population of this tiny moss was found growing on damp, semi-shaded clay soil at Sagamore Hill Solar Observatory and Antennae Complex. This site appears to be fertile ground for ephemeral mosses. In addition to *Fissidens exilis*, the second Massachusetts record of *Pleuridium ravenelii* Aust. was collected in the same vicinity. *Pleuridium ravenelii* is primarily a coastal plain species initially reported for Massachusetts from Nantucket (see Crum and Anderson 1981). Crum and Anderson (1981) reported *F. exilis* as a rare and local species with a range including Indiana, Kentucky, Maryland, Michigan, New York, Ohio, and Pennsylvania in North America. The specimen collected in Hamilton matches the illustration and description of *F. exilis* published by Steere (1950), who first observed and illustrated the bluntly and irregularly serrate margins of vaginant lam-

inae with an intramarginal border somewhat differentiated from that of North American specimens. This observation led to his comment that the New World populations possibly represent a species distinct from the Old World *F. exilis*. This is in contrast to several modern European floras (Nyholm 1954; Smith 1978; Frahm and Frey 1987) which continue to describe the leaf margins of vaginant laminae on all *F. exilis* specimens as finely and evenly serrulate or crenulate.

Haplocladium microphyllum (Hedw.) Broth. (LESKEACEAE)

Berkshire County (Florida) SC-E

Cooper-Ellis (1994) collected this species from a decaying log in an old-growth hardwood forest as part of her graduate research on the bryophytes of western Massachusetts old-growth forests. This research also generated several county records for sites in Berkshire and Franklin Counties. Additional ecological information on these species is provided by Cooper-Ellis (in press). This moss can be considered somewhat weedy in calcareous habitats, although that habitat is not limiting. The species is widespread in continental North America. It is also known from southeast Asia and northern Europe. This species was previously reported as doubtful for Massachusetts by Hilferty (1960).

Plagiomnium ellipticum (Brid.) T. Kop. (MNIACEAE)

Franklin County (High Ledges Wildlife Sanctuary, Massachusetts Audubon Society, Shelbourne Falls) JEA

This moss was collected under shaded conditions in the vicinity of Spring Brook. Another state record (*Rhizomnium appalachianum*), also from the family Mniaceae, was collected from this location as well. The range of the species is circumpolar, generally more common northward. It has been encountered in rich fens elsewhere in its range.

Polytrichum pallidisetum Funck (POLYTRICHACEAE)

Hampden County (Westover Air Force Base, Chicopee) SC-E

Norfolk County (Blue Hills Reservation, MDC, Milton) BCT & RA

At Westover Air Force Base, this species was collected on a log in a young hardwoods wetland. Although this species has long been confused with *Polytrichum ohioense* Ren. & Card., it is common in much of eastern North America, as well as central

Europe. It is typically found in more northern latitudes or at higher elevations in coniferous forest.

Pseudoleskeella tectorum (Funck ex Brid.) Kindb. in Broth.
(LESKEACEAE)

Worcester County (Harvard Forest, Petersham) PW

This species was collected from the trunk of an oak within the Prospect Hill Tract of Harvard Forest in Petersham. This and other Worcester County moss records were collected in conjunction with the long-term ecological research being conducted at Harvard Forest. *Pseudoleskeella tectorum* has a disjunct distribution in the East, being more characteristic of the western mountains of North America (Wilson and Norris 1989). It is reported by Clemants and Ketchledge (1990) as rare in New York State. This is the first record for this species in the New England states.

Rhabdoweisia crispata (With.) Lindb. (DICRANACEAE)

Franklin County (Adams Mountain, Rowe) SAW

This species was collected from soil over rock at Adams Mountain in Rowe. It is widespread in eastern North America, northern and central Europe, Southeast Asia, Africa, and the Pacific Islands.

Rhizomnium appalachianum T. Kop. (MNIACEAE)

Franklin County (High Ledges Wildlife Sanctuary, Massachusetts Audubon Society, Shelbourne Falls) JEA & PWD

This species, along with another state record moss species, *Plagiomnium ellipticum*, was collected under shaded conditions in the vicinity of Spring Brook at High Ledges Wildlife Sanctuary. In the Appalachian system, this species grows mainly in seepage and particularly on rock and ledges in the spray of waterfalls. It occurs throughout eastern North America and westward to Manitoba.

Scorpidium scorpioides (Hedw.) Limpr. (AMBLYSTEGIACEAE)

Berkshire County (Kampoosa Bog, Stockbridge) SS

Hampden County (Wilbraham) GM

Motzkin (1994) listed this species in his study of calcareous fens in western Massachusetts and adjacent New York and Connecticut. It has also been recently located in at least five sites in

New Hampshire. (N. Slack, pers. comm., 1997). Motzkin's collections of *Scorpidium scorpioides*, as well as that of another state record, *Sphagnum contortum*, were made at the same site in Wilbraham. The species is primarily circumpolar. These new locales are among the more southern sites in eastern North America. The State of New York includes this species on its list of rarities (Clemants and Ketchledge 1990).

***Sphagnum centrale* C. Jens. in Arnell & C. Jens. (SPHAGNACEAE)**

Franklin County (Hawley Bog, Hawley) SC-E

At Hawley Bog, this *Sphagnum* species is found at the margins of the wetland. Crum and Anderson (1981) noted the species' tendency at the southern end of its range to be found among shrubs at the margins of bog mats. Commonly found in rich boggy woods in Michigan and New York, it is readily confused with *S. palustre* given the lack of reliable field characters (N. Slack, pers. comm., 1997). Its range in North America is from Newfoundland to Alaska, south through Washington, Iowa, Illinois, Indiana, West Virginia, and New Jersey. It is also known from Europe and reported from Greenland and northern Asia.

***Sphagnum contortum* Schultz (SPHAGNACEAE)**

Hampden County (Wilbraham) GM

Motzkin (1994) listed this species in his study of calcareous fens in western Massachusetts and adjacent New York and Connecticut. His collections of *Sphagnum contortum*, as well as that of another state record, *Scorpidium scorpioides*, were from the same site in Wilbraham. This species is apparently circumpolar and is known in the east from Nova Scotia to New York and Michigan, although the distribution is considered poorly understood.

***Sphagnum wulfianum* Girg. (SPHAGNACEAE)**

Berkshire County (Canoe Meadows Wildlife Sanctuary, Massachusetts Audubon Society, Pittsfield) JEA

This species was collected in 1990 from a small swamp at Canoe Meadows Wildlife Sanctuary. Nearly all of the tamarack in this wetland had died recently from what remain undetermined causes. This species has a broad range through northern North

America, northern Europe, and northern Asia. The most southern reported locale on the east coast is Connecticut.

***Warnstorfia pseudostraminea* (C. Muell.) Tuom. & T. Kop. (AMBLYSTEGIACEAE)**

Franklin County (Hawley Bog, Hawley) SC-E

This moss species was found in a red maple swamp at the south end of the wetland, where sedges and mosses characteristic of neutral-basic conditions dominate. Some rare liverwort taxa also occur in this area. This species, previously known as *Calliergidium pseudostramineum*, is considered rare by Crum and Anderson (1981) and has been reported from Maine, New Hampshire, Michigan, and Alaska, as well as Germany, Scandinavia, and Greenland.

ACKNOWLEDGMENTS. We thank Raymond Abair, Howard Crum, Peter Dunwiddie, Glenn Motzkin, Jerry Jenkins, Carol Knapp, Lois Quillinan, Sally Shaw, Nancy Slack, Susan Williams, and Paul Wilson for providing vouchers, verifications, and/or permission to cite their collections. Howard and Irene Crum, William Buck, and Nancy Slack are thanked for their review of the manuscript. Tom Chase is thanked for his assistance to PWD in making collections on Martha's Vineyard. The Massachusetts Natural Heritage and Endangered Species Program provided partial funding to SC-E for some of this work. The Center for Biological Conservation of the Massachusetts Audubon Society provided support to JEA during the writing of this paper.

LITERATURE CITED

- ANDERSON, L. E. 1990. Checklist of *Sphagnum* in North America north of Mexico. *Bryologist* 93: 500–501.
- ANDERSON, L. E., H. A. CRUM, AND W. R. BUCK. 1990. List of mosses of North America north of Mexico. *Bryologist* 93: 448–499.
- CLEMANTS, S. E. AND E. H. KETCHLEDGE. 1990. Flora Protection: The question of rare mosses in New York State, pp. 211–216. *In*: R. S. Mitchell, C. J. Sheviak, and D. J. Leopold, eds., *Ecosystem Management: Rare Species and Significant Habitats*. Proceedings of the 15th Annual Natural Areas Conference. N.Y. State Mus. Bull. 471. Albany, NY.
- COOPER-ELLIS, S. 1994. Ecology and distribution of bryophytes in old-growth forests of western Massachusetts. M. A. thesis, Smith College, Northampton, MA.

- . (in press) Bryophytes in old-growth forests of western Massachusetts. Bull. Torrey Bot. Club.
- CRUM, H. A. AND L. E. ANDERSON. 1981. Mosses of Eastern North America, Vols. 1 & 2. Columbia Univ. Press, New York.
- FRAHM, J. P. AND W. FREY. 1987. Moosflora. UTB, Stuttgart.
- HILFERTY, F. J. 1960. The mosses of Massachusetts. *Rhodora* 62: 145–173.
- IRELAND, R. R. 1969. A taxonomic revision of the genus *Plagiothecium* for North America, north of Mexico. Canadian National Museum of Natural Sciences, Publications in Botany 1: 1–118.
- . 1982. Moss Flora of the Maritime Provinces. National Museum of Natural Sciences. Publications in Botany No. 13. Ottawa, Ontario, Canada.
- JUDD, W. S. 1980. Bryophytes of the peat mat at Ponkapoag Pond, eastern Massachusetts, with taxonomic and ecological notes on *Sphagnum*. *Rhodora* 82: 563–578.
- MISHLER, B. D. AND N. G. MILLER. 1983. Distributional studies of Massachusetts bryophytes. *Rhodora* 85: 421–432.
- MOTZKIN, G. 1994. Calcareous fens of western New England and adjacent New York State. *Rhodora* 96: 44–68.
- NYHOLM, E. 1954. Illustrated Moss Flora of Fennoscandia II. Musci, Fasc. 1. CWK Gleerup, Lund.
- REESE, W. D. AND L. E. ANDERSON. 1997. *Leucodon andrewsianus*, comb. et stat. nov. *Bryologist* 100: 92–97.
- SHAW, A. J. 1981. A taxonomic revision of the propaguliferous species of *Pohlia* (Musci) in North America. *J. Hattori Bot. Lab.* 50: 1–81.
- SMITH, A. J. E. 1978. The Moss Flora of Britain and Ireland. Cambridge Univ. Press, Cambridge, England.
- AND H. L. K. WHITEHOUSE. 1978. An account of the British species of the *Bryum bicolor* complex including *B. dunense*, sp. nov. *J. Bryol.* 10: 29–47.
- SORRIE, B. A. AND P. W. DUNWIDDIE. 1996. The Vascular and Non-Vascular Flora of Nantucket, Tuckernuck, and Muskeget Islands. Massachusetts Audubon Society, Massachusetts Natural Heritage and Endangered Species Program, Nantucket Maria Mitchell Association, and The Nature Conservancy. Nantucket, MA.
- STEERE, W. C. 1950. Notes on *Fissidens*. II. The discovery of *Fissidens exilis* in North America. *Bryologist* 53: 131–136.
- WELCH, W. H. 1960. A Monograph of the Fontinalaceae. Martinus Nijhoff, The Hague.
- WILSON, P. AND D. H. NORRIS. 1989. *Pseudoleskeella* in North America and Europe. *Bryologist* 92: 387–396.

APPENDIX: MOSSES OF MASSACHUSETTS, NEW COUNTY RECORDS
(VOUCHER SPECIMENS DEPOSITED IN FH)

- BARNSTABLE COUNTY (Cape Cod Air Force Base, Bourne)
Callicladium haldanianum (Grev.) Crum BCT & RA
Dicranum condensatum Hedw. BCT & RA

- Dicranum montanum* Hedw. BCT & RA
Ditrichum lineare (Sw.) Lindb. BCT & RA
Hypnum pallescens (Hedw.) P. Beauv. BCT & RA
Plagiothecium laetum Schimp. in B.S.G. BCT & RA
Pleurozium schreberi (Brid.) Mitt. BCT & RA

BERKSHIRE COUNTY

- Drepanocladus aduncus* (Hedw.) Warnst. SS (Kampoosa Bog, Stockbridge)
Helodium blandowii (Web. & Mohr) Warnst. GM (Williamstown)
Helodium blandowii var. *helodioides* (Ren. & Card. in Röhl) Crum et al. SS
 (Egremont)
Oncophorus wahlenbergii Brid. LQ (west of Williamstown)
Sphagnum fimbriatum Wils. GM (Stockbridge)

DUKES COUNTY

- Anomodon rostratus* (Hedw.) Schimp. SC-E (Cedar Tree Neck Sanctuary, Chilmark)
Atrichum undulatum (Hedw.) P. Beauv. PWD 1327 (Chilmark)
Aulacomnium palustre (Hedw.) Schwaegr. SC-E (Cedar Tree Neck Sanctuary) and JEA (Felix Neck Wildlife Sanctuary)
Brachythecium salebrosum (Web. & Mohr) Schimp. in B.S.G. CK (Chilmark)
Bryoandersonia illecebra (Hedw.) Robins. PWD 1330 (Chilmark)
Dicranella heteromalla (Hedw.) Schimp. PWD 1335 (Chilmark)
Dicranum condensatum Hedw. PWD 1358 (Lobsterville)
Dicranum fulvum Hook. PWD 1339, 1343 (Chilmark)
Ditrichum lineare (Sw.) Lindb. PWD 1384 (Long Point Reservation, Chilmark)
Hedwigia ciliata (Hedw.) P. Beauv. PWD 1345 (Chilmark)
Hypnum cupressiforme Hedw. PWD 1323 (Chilmark)
Hypnum imponens Hedw. PWD 1347 (Chilmark)
Leucobryum albidum (Brid.) Lindb. JEA (Felix Neck Wildlife Sanctuary, Edgartown)
Leucobryum glaucum (Hedw.) Schimp. PWD 1311 (Long Point Reservation, Chilmark)
Mnium hornum Hedw. SC-E (Cedar Tree Neck Sanctuary, Chilmark)
Platygyrium repens (Brid.) B.S.G. PWD 1354 (Menemsha Hills)
Pogonatum pensilvanicum (Hedw.) P. Beauv. PWD 1350 (Menemsha Hills)
Polytrichum commune Hedw. PWD 1301 (West Tisbury)
Polytrichum ohioense Ren. & Card. PWD 1360, 1314 (Lobsterville & Long Point Reservation, Chilmark)
Polytrichum piliferum Hedw. PWD 1302, 1359 (Lobsterville & West Tisbury)
Sphagnum capillifolium (Ehrh.) Hedw. PWD 1366, 1383 (Chilmark)
Sphagnum fimbriatum Wils. PWD 1365 (Chilmark)
Tetraphis pellucida Hedw. PWD 1342 (Chilmark)
Thelia hirtella (Hedw.) Sull. JEA (Felix Neck Wildlife Sanctuary, Edgartown) and PWD 1320 (Chilmark)

Thuidium delicatulum (Hedw.) Mitt. SC-E (Cedar Tree Neck Sanctuary, Chilmark)

Warnstorfia exannulata (Schimp.) Loeske PWD 1370 (Chilmark)

ESSEX COUNTY (Sagamore Hill Solar Observatory, Hamilton)

Campyllum polygamum (B.S.G.) Bryhn. BCT & RA

Fissidens bushii Card. & Thér. BCT & RA

Pseudotaxiphyllum elegans (Brid.) Iwats. BCT & RA

Pleuridium ravenelii Aust. BCT & RA

FRANKLIN COUNTY

Andreaea rothii Web. & Mohr SAW (Rowe)

Aulacomnium palustre (Hedw.) Schwaegr. SC-E (Hawley Bog, Hawley)

Barbula unguiculata Hedw. SAW (Rowe)

Brachythecium digastrum C. Muell. & Kindb. NS 2480 (Mt. Toby State Forest)

Brachythecium oedipodium (Mitt.) Jaeg. JEA & PWD (High Ledges Wildlife Sanctuary) and SAW (Rowe)

Brachythecium reflexum (Starke) B.S.G. SAW (Rowe)

Brachythecium velutinum (Hedw.) B.S.G. JEA (High Ledges Wildlife Sanctuary, Shelbourne Falls)

Bryum argenteum Hedw. SAW (Rowe)

Bryum caespiticium Hedw. SAW (Rowe)

Bryum capillare Hedw. SAW (Rowe)

Calliargon cordifolium (Hedw.) Kindb. SC-E (Hawley Bog)

Campyllum stellatum (Hedw.) Lange & Jens. SC-E (Rowe)

Climacium dendroides (Hedw.) Web. & Mohr. SAW (Rowe)

Dicranella heteromalla (Hedw.) Schimp. JEA & PWD (High Ledges Wildlife Sanctuary, Shelbourne Falls)

Dicranum fuscescens Turn. JEA (Bear Swamp Reservation, Ashfield)

Dicranum undulatum Brid. SC-E (Rowe)

Drepanocladus aduncus (Hedw.) Warnst. var. *aduncus* SC-E (Hawley Bog, Hawley)

Entodon compressus (Hedw.) C. Muell. SAW (Rowe)

Entodon seductrix (Hedw.) C. Muell. SAW (Rowe)

Fissidens bushii Card. & Thér. SAW (Rowe)

Fontinalis antipyretica var. *gigantea* Sull. SAW (Rowe)

Fontinalis novae-angliae Sull. SAW (Rowe)

Forsstroemia trichomitria (Hedw.) Lindb. SAW (Rowe)

Funaria hygrometrica Hedw. SAW (Rowe)

Haplocladium virginianum (Brid.) Broth. SAW (Rowe)

Helodium blandowii (Web. & Mohr) Warnst. SC-E (Hawley Bog, Hawley)

Hygrophypnum ochraceum (Turn.) Loeske SAW (Rowe)

Hymenostylium recurvirostre (Hedw.) Dix. NS 2472 (Mt. Toby State Forest)

Hypnum lindbergii Mitt. GM (Deerfield & Greenfield)

Isopterygiopsis muelleriana (Schimp.) Iwats. SAW (Rowe)

Leptodictyum riparium (Hedw.) Warnst. SAW (Rowe)

Leskea polycarpa Hedw. NS 2373 (Mt. Toby State Forest)

- Leucobryum albidum* (Brid.) Lindb. JEA (High Ledges Wildlife Sanctuary, Shelbourne Falls)
- Neckera pennata* Hedw. SAW (Rowe)
- Orthotrichum sordidum* Sull. & Lesq. SAW (Rowe)
- Philonotis fontana* (Hedw.) Brid. SC-E and GM (Deerfield)
- Physcomitrium pyriforme* (Hedw.) Hampe SAW (Rowe)
- Plagiothecium laetum* Schimp. in B.S.G. SAW (Rowe)
- Pleurozium schreberi* (Brid.) Mitt. SAW (Rowe)
- Pohlia cruda* (Hedw.) Lindb. SC-E (Mt. Toby, Sunderland)
- Polytrichum piliferum* Hedw. SAW (Rowe)
- Pseudobryum cinclidioides* (Hüb.) T. Kop. JEA (Orange)
- Pylaisiella selwynii* (Kindb.) Crum et al. SAW (Rowe)
- Racomitrium aciculare* (Hedw.) Brid. SAW (Rowe)
- Rhizomnium punctatum* (Hedw.) T. Kop. SC-E (Hawley Bog, Hawley)
- Sanionia uncinatus* (Hedw.) Loeske SAW (Rowe)
- Schistidium agassizii* Sull. & Lesq. in Sull. SAW (Rowe)
- Sphagnum angustifolium* (C. Jens. ex Russ.) C. Jens. in Tolf. SC-E (Hawley Bog, Hawley)
- Sphagnum fimbriatum* Wils. SC-E (Hawley Bog, Hawley)
- Sphagnum fuscum* (Schimp.) Klinggr. JEA (High Ledges Wildlife Sanctuary, Shelbourne Falls)
- Steerecleus serrulatus* (Hedw.) Robins. SAW (Rowe)
- Thuidium recognitum* (Hedw.) Lindb. SAW (Rowe)
- Trematodon ambiguus* (Hedw.) Broth. SAW (Rowe)
- Ulota coarctata* (P. Beauv.) Hammar SAW (Rowe)
- Ulota crista* (Hedw.) Brid. JEA & PWD (High Ledges Wildlife Sanctuary, Shelbourne Falls)
- Weissia controversa* Hedw. SAW (Rowe)

HAMPDEN COUNTY (Westover Air Force Base, Chicopee)

- Amblystegium serpens* (Hedw.) Schimp. in B.S.G. BCT
- Aulacomnium androgynum* (Hedw.) Schwaegr. BCT
- Brachythecium salebrosum* (Web. & Mohr) Schimp. in B.S.G. BCT
- Bryhnia novae-angliae* (Sull. & Lesq.) Grout BCT and SC-E
- Bryum caespiticium* Hedw. BCT
- Calliargon cordifolium* (Hedw.) Kindb. SC-E
- Calliargonella cuspidata* (Brid.) Loeske BCT
- Campylium chrysophyllum* (Brid.) Bryhn BCT
- Campylium radicale* (P. Beauv.) Grout SC-E
- Climacium dendroides* (Hedw.) Web. & Mohr BCT
- Dicranum flagellare* Hedw. BCT
- Dicranum montanum* Hedw. BCT
- Entodon seductrix* (Hedw.) C. Muell. BCT
- Hedwigia ciliata* (Hedw.) P. Beauv. BCT
- Helodium blandowii* (Web. & Mohr) Warnst. SC-E
- Helodium paludosum* (Sull.) Aust. BCT
- Hypnum cupressiforme* Hedw. BCT
- Hypnum imponens* Hedw. BCT
- Leskea gracilescens* Hedw. BCT

- Mnium hornum* Hedw. BCT
Orthotrichum anomalum Hedw. BCT
Orthotrichum obtusifolium Brid. BCT
Orthotrichum sordidum Sull. & Lesq. BCT
Physcomitrium pyriforme (Hedw.) Hampe BCT & SC-E
Plagiothecium cavifolium (Brid.) Iwats. BCT
Plagiothecium laetum Schimp. in B.S.G. SC-E
Pohlia nutans (Hedw.) Lindb. BCT
Polytrichum piliferum Hedw. BCT
Rhizomnium magnifolium (Horik.) T. Kop. SC-E
Rhizomnium punctatum (Hedw.) T. Kop. BCT
Schistidium agassizii Sull. & Lesq. in Sull. BCT
Sphagnum compactum DC. BCT
Sphagnum fimbriatum Wils. BCT and SC-E
Sphagnum palustre L. BCT
Ulota crispa (Hedw.) Brid. BCT

HAMPSHIRE COUNTY

- Brachythecium oedipodium* (Mitt.) Jaeg. SC-E (Arcadia Wildlife Sanctuary, Easthampton)
Brotherella recurvans (Michx.) Fleisch. JEA (Graves Farm Wildlife Sanctuary, Williamsburg)
Bryhnia novae-angliae (Sull. & Lesq.) Grout SC-E (Arcadia Wildlife Sanctuary, Easthampton)
Calliargon cordifolium (Hedw.) Kindb. JEA (Arcadia Wildlife Sanctuary, Easthampton)
Cyrto-hypnum minutulum (Hedw.) Buck & Crum SC-E (Williamsburg)
Dichelyma capillaceum (With.) Myr. JEA (Arcadia Wildlife Sanctuary, Easthampton)
Dicranum montanum Hedw. SC-E (Unquomont Mt., Williamsburg)
Dicranum polysetum Sw. JEA (Graves Farm Wildlife Sanctuary, Williamsburg)
Dicranum scoparium Hedw. SC-E (Graves Farm Wildlife Sanctuary, Williamsburg)
Drepanocladus aduncus (Hedw.) Warnst. SC-E (Arcadia Wildlife Sanctuary, Easthampton)
Fissidens bushii Card. & Thér. SC-E (Williamsburg)
Herzogiella striatella (Brid.) Iwats. JEA (Graves Farm Wildlife Sanctuary, Williamsburg)
Hypnum cupressiforme Hedw. SC-E (Arcadia Wildlife Sanctuary, Easthampton)
Hypnum fertile Sendtn. JEA (Graves Farm Wildlife Sanctuary, Williamsburg)
Hypnum imponens Hedw. SC-E (Arcadia Wildlife Sanctuary, Easthampton)
Hypnum lindbergii Mitt. SC-E (Graves Farm Wildlife Sanctuary, Williamsburg)
Leptodictyum riparium (Hedw.) Warnst. SC-E (Williamsburg)
Leskea gracilescens Hedw. SC-E (Hadley)

- Leucodon andrewsianus* (Crum & Anders.) Reese & Anders. SC-E (Graves Farm Wildlife Sanctuary, Williamsburg)
Neckera pennata Hedw. SC-E (Graves Farm Wildlife Sanctuary, Williamsburg)
Orthotrichum obtusifolium Brid. SC-E (Graves Farm Wildlife Sanctuary, Williamsburg)
Plagiomnium ciliare (C. Muell.) T. Kop. SC-E (Unquomont Mt., Williamsburg)
Plagiomnium medium (Bruch & Schimp. in B.S.G.) T. Kop. SC-E (Arcadia Wildlife Sanctuary, Easthampton)
Plagiothecium laetum Schimp. in B.S.G. SC-E (Arcadia Wildlife Sanctuary, Easthampton)
Pogonatum pensilvanicum (Hedw.) P. Beauv. SC-E (Williamsburg)
Polytrichum commune Hedw. SC-E (Sawmill Hills, Florence)
Polytrichum juniperinum Hedw. SC-E (Unquomont Mt., Williamsburg)
Polytrichum ohioense Ren. & Card. SC-E (Williamsburg)
Steerecleus serrulatus (Hedw.) Robins. SC-E (Williamsburg)
Ulota crispa (Hedw.) Brid. SC-E (Arcadia Wildlife Sanctuary, Easthampton)

MIDDLESEX COUNTY

- Orthotrichum pumilum* Mitt. BCT (Harvard University, Cambridge)

NANTUCKET COUNTY

- Sematophyllum demissum* (Wils.) Mitt. PWD 1389

NORFOLK COUNTY

- Andreaea rupestris* Hedw. BCT & RA (Blue Hills Reservation, Milton)
Aulacomnium androgynum (Hedw.) Schwaegr. LQ (Blue Hills Reservation, Milton)
Brachythecium digastrum C. Muell. & Kindb. BCT & RA (Blue Hills Reservation, Milton)
Climacium dendroides (Hedw.) Web. & Mohr BCT (Hale Reservation, Westwood)
Dicranum condensatum Hedw. BCT & RA (Blue Hills Reservation, Milton)
Dicranum muehlenbeckii B.S.G. BCT & RA (Blue Hills Reservation, Milton)
Isopterygium tenerum (Sw.) Mitt. BCT & RA (Blue Hills Reservation, Milton)
Leucobryum albidum (Brid.) Lindb. BCT (Hale Reservation, Westwood)
Orthotrichum anomalum Hedw. BCT & RA (Blue Hills Reservation, Milton)
Pohlia cruda (Hedw.) Lindb. BCT & RA (Blue Hills Reservation, Milton)
Polytrichastrum alpinum (Hedw.) G.L. Sm. BCT (Hale Reservation, Westwood)
Pseudotaxiphyllum elegans (Brid.) Iwats. LQ and BCT & RA (Blue Hills Reservation, Milton)
Pylaisiella polyantha (Hedw.) Grout BCT & RA (Blue Hills Reservation, Milton)

Racomitrium heterostichum (Hedw.) Brid. BCT & RA (Blue Hills Reservation, Milton)

Schistidium agassizii Sull. & Lesq. in Sull. BCT & RA (Blue Hills Reservation, Milton)

WORCESTER COUNTY

Brachythecium reflexum (Starke) B.S.G. PW (Harvard Forest, Petersham)

Bryoerythrophyllum recurvirostre (Hedw.) Chen PW (Harvard Forest, Petersham)

Campylostelium saxicola (Web. & Mohr) B.S.G. PW (Harvard Forest, Petersham)

Climacium dendroides (Hedw.) Web. & Mohr JEA (Cooks Canyon Wildlife Sanctuary, Barre)

Fontinalis antipyretica Hedw. var. *antipyretica* PW (Harvard Forest, Petersham)

Leskea gracilescens Hedw. PW (Harvard Forest, Petersham)

Paraleucobryum longifolium (Hedw.) Loeske PW (Harvard Forest, Petersham)

Plagiothecium cavifolium (Brid.) Iwats. PW (Harvard Forest, Petersham)

Plagiothecium laetum Schimp. in B.S.G. PW (Harvard Forest, Petersham)

Pterigynandrum filiforme Hedw. PW (Harvard Forest, Petersham)

Sphagnum angustifolium (C. Jens. ex Russ.) C. Jens. in Tolf. JEA (Flat Rock Wildlife Sanctuary, Fitchburg)

Sphagnum fallax (Klinggr.) Klinggr. PW (Harvard Forest, Petersham)

Sphagnum fuscum (Schimp.) Klinggr. PW (Harvard Forest, Petersham)

Sphagnum papillosum Lindb. JEA (Flat Rock Wildlife Sanctuary, Fitchburg)